

# NR 445 Revisions: Wisconsin's Air Toxics Rule



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**Air Toxics Meeting Agendas, Minutes and Materials**

<http://www.dnr.state.wi.us/org/aw/air/hot/eventscal.htm>

# History of NR 445

- **1980s** - Air Toxics became controversial (EPA delisted VOCs - methylene chloride & 1,1,1- Trichloroethane)
- **1985** - Task Force Report on Toxics
- **1988** - First Rules
- **1990** - Table 4 Studies
- **1994** - Reference Concentrations (RfCs) (chronic non-cancer effects)





# Two Main Categories of Health Effects To Consider

- **Carcinogens** - chemicals that can cause cancer  
Tables 3A and 3B contain carcinogens
- **Non-Carcinogens** - chemicals that can cause any other toxicity. Tables 1,2,4, and 5 contain non-carcinogens. Examples:
  - Respiratory toxicity (irritation, bronchitis, etc.)
  - Neurotoxicity (effects on nervous system)
  - Nephrotoxicity (kidney damage)
  - Hepatotoxicity (liver damage)
  - Reproductive toxicity (reproductive failure, effects on offspring, etc.)



# Major Chemical Groups

- Carcinogens** - If listed by International Agency for Research on Cancer (IARC) and National Toxicology Program (NTP). Chronic exposure over 70 years is typically evaluated. WI-DNR uses annual average concentrations for estimating exposures.
- Non-Carcinogens** - Threshold Limit Values (TLVs) from American Conference of Governmental and Industrial Hygienists (ACGIH). Acute effects (1 hour & 24 hour) are evaluated for TLV chemicals. Also US EPA Reference Concentrations (RfCs) used for chronic exposures (annual averaging period used).



# National Toxicology Program (NTP)

- US Dept. of Health and Human Services, Public Health Service
  - Mission from Congress is to evaluate cancer causing chemicals and issue a report listing them at least every 2 years
  - Process is being improved for more peer review and public comment
  - 8th Report on Carcinogens - 1998
  - 9th Report on Carcinogens - 1999
- see <http://ehis.niehs.nih.gov/roc/toc9.html>



# International Agency for Research on Cancer (IARC)

Part of World Health Organization (WHO)

- IARC's mission is to coordinate and conduct research on the causes of human cancer, the mechanisms of carcinogenesis, and to develop scientific strategies for cancer control.
- International Scientific Group
- Publishes Monographs on chemicals, mixtures and occupational exposures
- Web Address: [www.iarc.fr](http://www.iarc.fr)



# ACGIH - TLVS

**American Conference of Governmental Industrial Hygienists -  
Threshold Limit Values**

◆ **Occupational Health Guidelines established by an independent scientific body. The TLV book is published yearly. TLVs are for airborne chemicals, so they consider whether a material can be present in the workplace atmosphere.**

◆ **TLVs represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects....a smaller percentage may be affected more seriously.**

◆ **Web Address: [www.acgih.org/](http://www.acgih.org/)**



# How Ambient Air Concentration is Calculated from TLV

- 8 hour TLV adjusted using safety factor of 42 (This is 2.4% of TLV;  $1/42 = .024$ )
- Factor of 10 for sensitive individuals
- Factor of 4.2 for public exposure conversion from occupational exposure; 168 hrs for public/40hr workweek = 4.2
- 1 hour TLV - ceiling adjusted using safety factor of 10 (This is 10% of TLV)



# Reference Concentrations

- **WI-DNR uses only US EPA derived Reference concentrations.**
- **Definition:** An estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.



# Standards for Carcinogens

- The standards that must be met for carcinogens are technology based. There currently is no risk based standard that addresses the concentration of a carcinogen after control technology is applied
- **Lowest Achievable Emission Rate (LAER)** technology for known carcinogens
- **Best Available Control Technology (BACT)** for Suspected carcinogens (Table 3B)



# Standards for Non-Carcinogens

- The standard to meet is an Ambient Air Concentration.
- An ambient air concentration (AAC) is calculated in micrograms per cubic meter ( $\mu\text{g}/\text{M}^3$ )
  - It is 2.4% of TLV for most TLVs
  - It is 10% of TLV for ceiling limit TLVs
  - It is the reference concentration for USEPA chemicals with an RfC



# What are the NR 445 Tables?

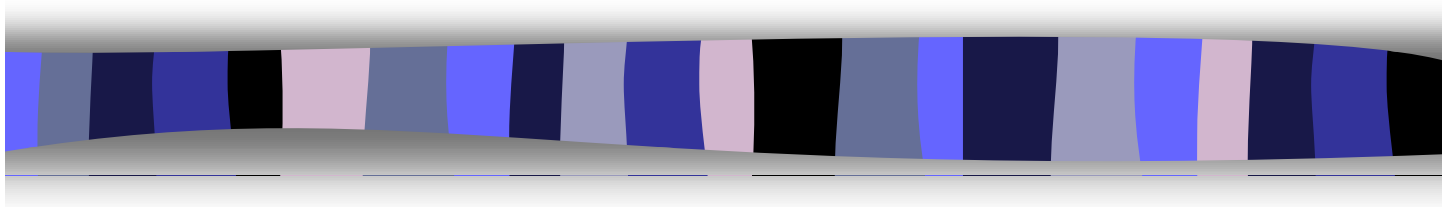
- **Tables 1 & 4** are for chemicals non-carcinogenic toxicity that have a TLV based ambient air concentration.
- **Table 2** is for pesticides (those with a TLV) but the ambient air concentrations only apply to manufacturers of those chemicals



# What are the NR 445 Tables?

(continued)

- **Table 3** is for carcinogens.
  - **3A** Known human carcinogens
  - **3B** Suspected human carcinogens
- **Table 5** is for chemicals with a USEPA reference concentration.
  - The reference concentration protects against non-carcinogenic effects over a lifetime



The first part of the paper discusses the importance of understanding the cultural context of the research. It highlights how cultural differences can influence the interpretation of data and the design of the study. The second part of the paper focuses on the methodology used in the research. It describes the sampling process and the data collection methods. The third part of the paper presents the results of the study. It includes a table showing the distribution of responses across different categories. The final part of the paper discusses the implications of the findings and suggests areas for future research.